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ABSTRACT

To explore the relationship between inquiry and composing, a study interviewed 14 faculty members from several disciplines at the University of California at Santa Barbara, inquiring about the natural history of their research projects; where their ideas originated; what they did with those ideas; where their research took them; and what was the final outcome of the project. Interviews were tape recorded and transcribed. Analysis revealed that personal interests, as well as theoretical issues, shaped the informants' choice of research projects. In fact, it became clear that the ways in which questions emerged in the interaction of personal and disciplinary concerns and the unexpected ways that understanding developed as the projects proceeded were congruent with the emergence and development of ideas in the composing process, particularly in academic writing. (One table of data is included.) (MM)

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Inquiry as a Human Process: Interviews With Researchers Across the Disciplines

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Inquiry as a Human Process: Interviews With Researchers Across the Disciplines

> "It looks like a very narrow topic, and it is -- extremely narrow -- but if you identify a real problem, and follow that problem where it leads you, you will find it reveals all sorts of things about the larger theory. Though the shaft is narrow, it takes you into the cavern, and when you begin to see what all is there ... That is exciting."

The image of mining -- of working a narrow passage until it opens up into a cavern full of connections to other ideas -- is a social scientist's description of his theoretical inquiry, not a writer's description the composing process. The similarity, however, seems to us too profound to take lightly. Indeed, curiosity about the relationship between these two processes, inquiry and composing, had grown, for both of us, through a decade of work in cross-disciplinary writing programs in two universities. Increased contact with researchers in all fields made us more and more aware of the way the content of the texts -- the knowledge they present -- was generated by a process of inquiry and is subject to revision. That our students' reading and writing totally lacked such awareness bothered us more and more. We believed that if we could get into the drama of creating knowledge, if we could get behind the scenes and reveal it as a human process with elements they could recognize, then not only would they understand the texts they read quite differently, but also they could see their own writing as inquiry and thereby commit

themselves to more systematic and far-reaching quests of their own. We therefore set out to interview some 14 UC Santa Barbara faculty from across the disciplines about their own research. [See Table 1.]

Table 1

Interviews Completed

Field	Topic
Social Sciences	
Anthropology	Violence among the Yanomamo
Education	Computers & composition
Educational Psychology	Learning disabled children
Social Science*	17th Century theorist
Psychology	Persuasion & groups
Natural Sciences	
Biology	Mono Lake ecosystem
Environmental Studies	Wind power
Geography	Soil & deforestation in Tanzania
Geology	Rotation of mountain ranges
Humanities	
English	John Barth
English	Thomas Merton
History	History of evil
Library Science	Chicano Collection
Linguistics	Hmong Language

* Field unidentified by request.

We asked our informants to give us the natural history of one of their research projects: where their ideas originated, what they did with them, where their research took them, and where they ended up. We taped these conversations, and the transcriptions give us the concrete experiences of their research, the twists and turns of

events --- their stories. These thick descriptions have themselves changed our perception of the inquiry process.

As we begin to generalize about that process, we have a profound sense that our generalizations derive their power and are in some ways inseparable from the living stories that produced them. To preserve our sense of that union, we will present two of the stories here, introducing them with some observations on the origins of projects and concluding with a few further generalizations about the course of research and the composing process. We believe this alternation of generalization and story will more adequately convey the rich potential of such projects for our own and our students' understanding.

Projects, like stories, are artificial constructs; they are stories that start with questions. The questions our informants' projects began with ranged from the abstract and philosophical ("How do we shape our lives?") to the specific and practical ("Where should these people plant trees?"). Though most defined their questions in field-specific terms -- interest in a particular kind of literature, history, geologic formation, energy source, etc. -- the larger questions driving their work arose at any point along a continuum between the self, the personal search, at one end and field-determined problems at the other. Since personal interests, of course, frequently shape the researcher's choice of discipline in the first place, it is impossible to say where "personal" leaves off and "field" begins; we can,

however, describe some differences in the researchers' perceptions of the origin of their projects, judged by the way the questions were described to us.

At the personal end, fascination with the power and shape of ideas themselves drive the questions of many, particularly in the humanities. Both the historian's study of evil and the literature scholar's study of Barth were described to us as part of personal quests for coherent world views. Other projects, such as the physicist's search for alternate energy sources, and the librarian's preservation of Chicano culture, were framed as personal needs to contribute to the solution of world problems. The geographer whose story we tell later belongs to this group.

At the other end of the spectrum are searches perceived and described as generated from issues in the discipline itself, often beginning either with some problem in a theory or with an observation which cannot be explained under the present theory. The social scientist's study of a 17th Century theorist (from which the quote introducing this essay was drawn), and the geologist's study of mountain ranges that do not fit tectonic plate theory both are of this kind, as is the anthropologist's whose story follows.

Most questions, however, seemed to emerge from interactions between personal interest, theoretical problems, and opportunity in unpredictable, ungeneralizable ways. Conversation, with people both inside and outside the field, was the most frequently mentioned catalyst for such

events. The psychologist, who had explored a long-term personal interest in inter-group conflict through study of group theory, was working with another psychologist whose interest lay in attitude theory; this collaboration generated her current studies in the effects of groups on attitude. These studies bring together the two theoretical streams [group theory and attitude theory] that, as she says, "did not talk to each other very well." The biologist was interested in saline eco-systems because of their potential to contribute to pure science; because such systems are simple, contain few organisms, they are an ideal field for defining basic ecological relationships. The existence of such a system at nearby Mono Lake, however, which was and is changing because of the diversion of water to Los Angeles, fused scientific, practical and environmental concerns into a very large, multidimensional, collaborative study of this eco-system. This coming together of disparate streams seems the most common occurrence regardless of whether the researcher frames the initial question in personal, theoretical, or practical terms.

If the origin of ideas is unpredictable, the course of research is equally so; it is to convey the contextual richness of this that we move to the stories themselves.

Anthropology: Napoleon Chagnon

The anthropologist's story is one of finding new footing amidst shifting paradigms -- a situation that seems more and more frequent as the boundaries between approaches and fields soften and become fluid everywhere. Napoleon Chagnon set off, in the mid-sixties, for the mountains of Venezuela to study primitive violence among the Yanomamo, one of the last societies in the world still engaged in primitive warfare. At that time, he says, "those who wanted to be 'scientific' cultural anthropologists explained violence and warfare in the primitive world (and the world at large) as competition over scarce material resources." Chagnon, an empiricist, intended to apply this economic-determinist theory to the Yanomamo. "But, when I began living with the people," he reports, "it became patently obvious that they had no shortage of anything, and yet they were fighting like crazy. Warfare mortality was extremely high, and yet their population densities were extraordinarily low; they could make a living on a few hours work a day, and they appeared to have an abundance of virtually everything." As he meticulously documented causes of violence and mortality rates, he was forced to separate himself from this highly "scientific," extremely popular viewpoint and to argue, quite cautiously, that, while the theory of competition may work in other societies, it didn't seem to work in this one, a society "as close to a pristine condition of primitive war as you can get." Champions of

the ecological-materialistic theory took this as a personal offense.

At the same time, another more powerful debate was brewing, this one coming from the adjacent field of biology, where the entomologist, W. D. Hamilton, was making a fundamental and far-reaching modification in the Darwinian concept of fitness. Hamilton was proposing the notion of 'inclusive fitness,' theorizing that reproductive success in the animal world might best be measured not by simple number of offspring, as Darwin had postulated, but by the number of one's genes that survived via relatives. Within biology, this theory explained a great deal of apparently altruistic behavior in the animal world that Darwin, who knew nothing of genes, left for later generations to explain. Then Edward O. Wilson, in his famous book, **Sociobiology**, extended the theory to include humans. Biological research suddenly encompassed a wide range of social strategies, particularly kinship activities, previously the province of anthropology.

Meanwhile Chagnon, who was continuing his field work quite independently of all this, published a paper (before Wilson's book was published), arguing that genetic relatedness was a good predictor of social behavior among the Yanomamo. Immediately he was, quite unwittingly, embroiled in this second, larger controversy precisely at the point where the the boundary between the fields was crumbling.

Reaction from his own field was immediate. Anthropology had long standing hostility toward biological explanations. The field held it as "received truth" that kinship is socially, not genetically based. Before Hamilton and Wilson, genetic arguments had been advanced chiefly by non-scientists as justification for social inequality and racial superiority; anthropologists wanted nothing to do with such company. That Chagnon's results had nothing to do with racial superiority mattered little. "It's important for students who are going to get involved in research to understand," Chagnon says, "that the academic world is not one big, altruistic, happy family where scholars and academics make decisions on whose theory is better on the basis of logic, reason, methods, science, etc.."

In the midst of the fire storm, Chagnon, operating now between theories, began to pull his hypotheses from both economic materialism and sociobiology, and to devise whatever methodologies his situation demanded. He draws not only on the empirical, or 'scientific' approaches of these two theories, which he favors, but also from the non-quantitative, or humanist branch of his own field. The "values-oriented data," as he calls it, flesh out the more solid skeleton of empirical data.

The whole experience, the very difficulty of leaving a theoretical orientation behind, the isolation of operating alone, has made him very aware of the problem of imposing particular points of view, or theoretical orientations, on

students in various programs. Thus you find, for example, followers of Clifford Geertz who all "see the world as a text to interpret," or "carbon copies of the leading empirical researchers," as he describes his own original stance, depending solely on quantifiable data. Now that his work has forced him to synthesize the paradigms, drawing ideas and methods from many realms of anthropology and from sociobiology, he finds, he says, no contradictions between the humanistic and empiricist approaches if they are used to reinforce each other. "Ultimately what I do," he says, "though I don't like to admit this, is use both the philosophy of science and the philosophy of art to render the external world intelligible."

Geography: Julia Allen Jones

When we asked geographer Julia Allen Jones where her research questions originated, we saw a powerful interaction between personal commitments and the demands of a field. Her goal, she says, is to do research "which is scientifically valuable but also has practical consequences." She sees an unfortunate "schism between science and practice," and comments that a lot of the twists and turns of her research development come from "trying to figure out what would be the most useful way of ... making a contribution. It's been helpful to have that as a yardstick, because pure science has a lot of yardsticks by which you measure the value of your contribution, [and] very

few of those yardsticks have anything to do with the value of your contribution to society as a whole."

For about the past ten years she has been doing field work in Tanzania, attempting to learn enough about their soils and forests to help them deal with widespread deforestation and subsequent soil degradation. In semi-arid tropical countries, such as Tanzania, even a relatively small-scale study can make a large contribution to knowledge, she says, for two reasons: 1) because research efforts have been focused on the tropical rain forests, such as in Costa Rica, not much ecological or soils research has been done in the semi-arid tropics. Thus basic findings from small scale studies are relatively important. 2) Most of the rural people who live in the tropics live in semi-arid tropics, where the land is barely able to provide enough to meet their needs. Thus even small gains in understanding of land resources can guide development in ways that matter a great deal to the people who live there.

Her twists and turns started with an M.A. program in international relations and economic development, where she had the general idea of helping Third World countries develop solar energy. Then she got the opportunity to travel to Tanzania. There she was struck by the lack of resources to build solar energy systems, and also by the environmental destruction caused by the major source of local energy -- cutting down trees for fuel wood. People were stripping the forests bare, and the soil on which new

growth would depend was eroding away. Jones realized that her skills as an economist were "superfluous" to the needs of people in Tanzania; she believed that she could make a much more profound contribution to solving some of the problems she saw there if she learned more about natural science, particularly forestry and soils.

Thus she returned to the U.S. and entered a Ph.D. program that would let her combine social science with natural science. She proposed a study which would, in her words, "somehow or another control soil erosion while producing enough fuel wood." Since at this point she knew nothing about such fields as hydrology, soils, forestry, vegetation studies, or mapping, nor anything about statistical analysis, she had to learn at least the rudiments of these fields in order to do the study. At a deeper level, she had to grapple with how scientific inquiry works -- how hypotheses are shaped and tested -- in order to design an experiment that would tell her what she wanted to find out.

She did the experiment and found that different soils in Tanzania were in fact affected differently by forest clearing, that some kinds recovered much faster, while others were much more vulnerable to deforestation. She then began to form the question which has driven much of her research since then: Is it possible to systematically predict soil characteristics that are relevant to management activities (such as harvesting timber and planting crops or

fuel wood plantations) by using a priori knowledge like maps of vegetation or geology or climate? If a system for making such predictions can be developed, then planners in relatively poor countries like Tanzania, who do not have the resources to go out and analyze the soil in every site, can use the system to make informed decisions about soil management.

Jones describes her process in these terms: "You can sort of picture a tree of questions branching out from this one question, any one of which or several of which one could choose to follow up. And that's to me what's really exciting about doing research -- is that having solved one idea, it raises more questions than you've answered, and then you have a choice of which one you think is the most interesting or most relevant or most important to go on and look at next." At the time of our interview, Jones was concluding one study and beginning to plan the next. The one she was finishing involved using three kinds of available data -- satellite imagery as an indicator of vegetation, together with maps of geology and topography -- to predict soil qualities. She was finding that these three kinds of data did allow her to make accurate predictions about soil qualities on relatively small scale maps [large area], but at the same time she was discovering that soil qualities were different in important ways on larger scale more detailed] maps -- perhaps influenced by the activities of termites, which scavenge the area around their mounds for

plant litter and thereby keep certain plant nutrients from recycling back into the soil. Thus she was planning to look at the effects of termites on soil, a study has implications that are both practical (generalizing a long standing suggestion by other researchers that if farmers break up abandoned termite mounds and scatter the dirt over the surrounding area, this might serve as a free source of fertilizer for nutrient-poor soil) and theoretical (whether the trees that are adapted to live in these poor soils could have co-evolved along with the termites). Another important theoretical aspect is whether soil fauna could influence soil storage of carbon over large areas and therefore influence regional and global carbon-dioxide emissions, now thought to be influencing global climate.

At each juncture in her research, new problems have emerged that have called for new methods and even for mastering new disciplines. This, she says, is to be expected: "When you do research, you never understand the problem that you are looking at, because you are always looking at a problem which is interesting because you don't understand it." The research consists at least as much in figuring out how to proceed as it does of actually gathering the data and analyzing it.

* * *

For very nearly all of our informants, the research itself led the quest in these unexpected directions. Following the question meant, for some, shifting subjects

within the field, for others changing methodologies, for others, changing fields. What one finds in the cavern at the end of the mine shaft -- a new author, aberrant data, questions in a field you know nothing about -- changes the topic or the direction of study. Progress may, as it did for the psychologist, require merging different theoretical streams, or, as for the anthropologist, hostile paradigms. One of the more interesting findings was the frequency with which data raised new questions that drove the researcher beyond the bounds of current theory.

Indeed, movement between disciplines like the geographer's above was far more common than we expected. We have come to be convinced that no matter how rigidly or rigorously the disciplines draw the boundaries of their concerns, how energetically empiricist and humanist insist on their respective methods of inquiry, it is the interaction of mind and data that sets the course and draws the researcher past those boundaries.

The more we conversed with our informants about academic inquiry, the clearer it became that the ways questions emerge in the interaction of personal and disciplinary concerns and the unexpected ways that understanding develops as the projects proceed are congruent with the emergence and development of ideas in the composing process, particularly in academic writing.

Such congruence has, we feel, important implications for us and for our students. We believe that stories like

these can themselves change students' view of texts as bank vaults filled with fixed knowledge and awaken them to the questioning stance we have found so difficult for them to achieve. It also has implications for writing specialists who consult with faculty in other disciplines about writing in their fields. If inquiry drives professional writing in those fields in the ways we see, writing specialists might advise their colleagues about constructing student assignments that mirror or reveal the inquiry process in their fields. For the composition theorist and practitioner, the congruence of the two processes demystifies inquiry in other fields. As a consequence, methodologies from various fields can be viewed as differing ways of making meaning, or controlling the making of meaning; such an understanding, we hope, can provide common ground for field-specific theories of inquiry and composing theory to begin to talk.

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